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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/047,266	01/14/2002	Chih-Ming Ke	67,200-641	4511

7590 07/02/2003

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EXAMINER

CHEN, KIN CHAN

ART UNIT PAPER NUMBER

1765

DATE MAILED: 07/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/047,266

Applicant(s)

KE ET AL.

Examiner

Kin-Chan Chen

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 16-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☒ Claim(s) 8-10 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election of prosecuting group I, claims 1-15 in Paper No. 3 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Objections

2. Claims 8, 9, 10, and 15 are objected to because of the following informalities:

In claims 9 and 15, the examiner suggests deleting "(ADI)" because it might have several meanings.

In claims 8 and 15, the examiner suggests deleting "(CD-SEM)" because it might have several meanings.

In claims 10 and 15, the examiner suggests deleting "(AEI)" because it might have several meanings.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. Claims 6, 7, and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 6 and 14, "Argon Fluoride 193 nanometer photoresist layer" is vague and indefinite. It is unclear as to the meaning of Argon Fluoride photoresist layer.

In claims 7 and 14, "Fluoride 157 nanometer photoresist layer" is vague and indefinite. It is unclear as to the meaning of Fluoride photoresist layer.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niu et al. (US 6,433,878; hereinafter "Niu") in view of McKee (US 5,804,088).

Niu teaches a method comprising plasma treating a semiconductor wafer having at least one photoresist layer. After plasma treating the semiconductor wafer, one or more critical dimensions on the at least one photoresist layer may be measured using an

electron beam (e.g., SEM), see col. 1, lines 60-67; col. 4, lines 32 through col. 5, lines 22.

Unlike the claimed invention, Niu does not teach that the plasma treating the semiconductor wafer prior to the measurement may shrink the photoresist, therefore prevent /or reduce shrinkage of the photoresist when using the electron beam.

However, it is a conventional process that using plasma treatment shrinks the

photoresist. In a method of lithography, McKee (abstract) teaches that using isotropic or partially isotropic etch (so-called plasma curing or plasma etching in the instant claims) shrinks the photoresist (also see Tsai et al. (US 6,368,974) and Sato (US 6,528,229) in the record as evidences). Hence, it would have been obvious to one with ordinary skilled in the art to use plasma treatment that shrinks the photoresist as disclosed by McKee in the process of Niu in order to yield reduced linewidth patterned photoresist. Because the combined Niu and McKee teaches the method claimed, the claimed property is considered to be inherent. Therefore, after the plasma treatment, it is expected that the further shrinkage would be reduced / or prevented when the photoresist layer is measured using an electron beam (e.g., SEM).

The limitations of dependent claims 3-5, 8 and 13 have been addressed above and rejected for the same reason, *supra*.

As to dependent claims 2 and 12, because the same materials are used with the same process steps, it appears that the method of the combined prior art would inherently contain the same properties and functions as claimed.

As to dependent claims 6, 7, and 14, the combined Niu and McKee is not particular about the photoresist used in the process, hence, it would have been obvious to one with ordinary skilled in the art to used said conventional photoresists in the process in order to provide their art recognized advantages and produce an expected result.

As to dependent claims 9, 10, and 15, it would have been obvious to one with ordinary skilled in the art to use electron beam (e.g., SEM) to measure one or more critical dimensions during any stage of fabrication (e.g., after-development inspection; after-etching inspection) to insure the quality of the product.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tsai et al. (US 6,368,974; abstract) and Sato (US 6,528,229; col. 1, line 66 through col. 2, line48) teach using plasma treatment shrinks the photoresist.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (703) 305-0222. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final

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communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2934.



Kin-Chan Chen
Primary Examiner
Art Unit 1765

K-C C
June 26, 2003